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THE CLINICAL DIVISIONS

OF

PNEUMONIA.

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Clinical Lecture delivered at the New York Post-Graduate Medical School.

BY

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presented by the author.

CLINICAL DIVISIONS OF PNEUMONIA.

This lecture, originally published in 1892, has been received with so much favor by the profession, and I am still so often asked for copies of it that a second edition seems to be called for. Some fresh matter has been added and several illustrative cases.

For some years antedating the bacteriological study of pneumonia many distinguished clinicians were inclined to the view that the pulmonary condition was the local expression of a general infection, and hence that the homely and obsolete term, lung fever, expressed the true pathological conception better than its more pretentious successor, pneumonia. It is a little singular that the late Prof. Flint, while fully endorsing this view, should have preferred the name pneumonitis as definitely conveying the idea of an inflammation of the lung as the essential feature of the disease.

To-day it is generally recognized that pneumonia is a disease of microbic origin, and that while the direct action of the microbe is limited in a greater or less degree to the lungs, the toxine derived from the microbe pervades the entire system.

The local lesion is not necessarily in proportion to the systemic infection; that is, we may have a very large implication of the lung with comparatively little evidence of general infection, and conversely we may have severe general infection with but little pulmonary implication. And again, without reference to the amount of lung involved, or even to the degree of fever present, we may have the vital forces but little impaired, or we may have the nervous and muscular systems completely overpowered by the intensity of the poison, constituting a condition that might almost be termed malignant.

Giving to terms already in use a more definite meaning than they have had heretofore, we may call these two classes of cases *Sthenic* and *Asthenic*. We may also admit a third division, based upon mechanical conditions by which the pulmonary circulation is rendered especially difficult, and to this division the term *Obstructive* may be applied. Viewed then from our present standpoint we may recognize three types of cases of Pneumonia: *Sthenic*, *Asthenic* and *Obstructive*.

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It so happens that we have in the wards at this time patients illustrating these three divisions.

The first case I will show you is that of a man, twenty-eight years of age, of previously good health, and temperate in his habits: he is now in the fourth day of the disease. His initial chill, four days ago, was of moderate severity, the pain in the chest was considerable, the temperature rose on the second day to 103.5° , and his pulse to 105, and on the following day the temperature reached 104.5° , and his pulse 116. At this time the respirations were 32 per minute. There is in this case a remarkable absence of the prostration which we see in many cases of pneumonia. The patient, on arriving at the hospital, insisted upon walking from the carriage to the elevator, and from the elevator to his bed in the ward. You will perceive now that when he is asked to sit up for the physical examination of the posterior portion of the chest, he rises without any evidence of feebleness; his hands are perfectly steady, and when his tongue is protruded there is no tremor. He is entirely capable, if allowed to do so, of walking about the ward. His mind is perfectly clear. When asked how he feels, the reply is "First rate." On examination, we find that on the right side, with the exception of the space above the fifth rib in front, and above the middle of the scapula behind, there is evidence of consolidation over the whole lung—that is to say, we have dullness on percussion and tubular respiration. Now, in this case, we have a large mass of lung implicated, while at the same time the constitutional symptoms are relatively slight. We are justified, therefore, in considering that in this case the force of the infection is comparatively moderate, and that the local lesion is the more prominent factor. On examining the heart we find that the pulmonary second sound is decidedly accentuated, indicating that there is marked obstruction to the pulmonary circulation on the one hand, and, on the other, a vigorous action of the right side of the heart; the blood is propelled into the pulmonary artery with force, but meeting resistance in the pulmonary circulation, there is a corresponding recoil of the column of blood against the valve, causing a loud and sharp pulmonary sound.

This patient's urine has been examined, and has been found free from albumen. The test with nitrate of silver shows the usual absence of the chlorides.

Now, in a case of this kind, there is very little necessity for treatment so long as the symptoms continue as we find them at the present moment. Such cases will recover in the majority of instances under whatever form of management may be adopted, if no plan is instituted which is in itself harmful. An expectant treatment will

meet all the demands of the case; the most that will be required will be attention to proper alimentation, and perhaps at the outset, during the time that the pain in the chest is severe, such local remedies as dry cupping, sinapisms, strapping the chest, or other measures which have for their object the relief of pain.

The next case that I have to show you is one in which the conditions are very materially different from those which we have just considered. This patient is a man, thirty-five years of age, of fairly good previous health, a car driver by occupation. His initial chill occurred three days ago, it was very severe, lasting, as he stated, more than an hour; it was followed by very marked prostration. From the moment of its occurrence there was a feeling of intense weakness; he took to his bed immediately, and, when removed to the hospital, had to be carried from his bed to the carriage, and from the carriage he was taken on a stretcher to the ward, and had to be lifted into bed. You find him now exhibiting the evidence of extreme muscular and nervous prostration. We place a glass of water in his hands, and in attempting to carry it to his lips he seizes the glass with both hands, nevertheless there is so much tremor that a portion of the water is spilled. The tongue also is tremulous. He is at times delirious, with a busy active delirium, a constant desire to get out of bed, but should he accomplish this, he would fall helplessly to the floor. His temperature on admission was 103.5° , his pulse 132, and his respiration 30. The relative slowness of respiration, as compared with the pulse, shows that it is not the amount of lung implicated which constitutes the gravity of the affection; the pulse being so much more frequent than the respiration indicates that the cardiac ganglia and probably the heart muscle are directly affected by the poison. On examining the heart we find that the first sound is extremely feeble, and the pulmonary sound is almost inaudible. The pulse is very small as well as frequent. The urine is found to be albuminous. It is stated that at the onset, immediately after the chill, there was vomiting. These conditions together indicate a very grave implication of the nervous system, showing an intensity of infection in marked contrast with that of the previous case. On physical examination, we find on the right side, dullness and tubular breathing in the summit of the lung, extending as far down as the fifth rib in front, and nearly to the angle of the scapula behind; in other parts of the lung there are a few moist rales, and also occasionally throughout the left lung. Still, the evidence of the physical signs is that the action of the respiratory apparatus is but moderately impaired. The gravity of the case depends upon the virulence of the infection, the direct poisoning of the nervous and muscular sys-

tems. The muscular weakness, which is so marked elsewhere, extends to the heart, as is indicated by the small and very frequent pulse, and by the character of the first sound. It is in this that the danger to our patient lies; it is not that his respiratory function is so far impaired as to create danger in that direction, but the danger is of primary heart failure, due to the poisoning of the nervous system and of the muscular fibre. The whole heart in this case, both the left as well as the right side, is markedly feeble in its action, and in our treatment the effort must be to keep up the cardiac action until the force of the infection is spent.

Cases of this type are more apt to prove fatal during the stage of high temperature. If we can tide them over until defervescence takes place the prognosis becomes much more favorable.

An early resort to alcoholic stimulants is required in cases of this kind. Alcohol in moderate quantities is doubtless a food, and one that is easily assimilated, and in the depressed condition of the nervous system which affects materially the function of digestion, it is important that the food given should be of a character to be readily digested and assimilated. Alcohol has also the effect of lowering the arterial tension, and for this reason is especially valuable under circumstances in which the cardiac muscular fibre is inadequate to the task of forcing the blood through the peripheral system. Carbonate of ammonium is also indicated. There are many drugs which have the reputation of being cardiac tonics, but we must remember that none of this class of remedies is able to supply anything directly to the tissues of the heart; they act simply upon the innervation of the heart, forcing it for the time being to increased activity, an activity which implies necessarily increased molecular waste and ultimate exhaustion. In the use of these remedies, it is important that they should at no time be pushed beyond the imperative needs of the moment, remembering that there is but a certain amount of energy which we can call upon, and if that amount is early exhausted, the subsequent result must be disastrous. The drug which is first thought of in cases of anticipated heart failure is digitalis. This drug, which is capable of being most useful, is also capable of doing the greatest harm. While for the time being, it undoubtedly forces the cardiac muscle into more vigorous contraction, it at the same time diminishes the calibre of the peripheral vessels, and thus, while adding to the force of the heart, it adds also to the work which it is required to perform. Doubtless, in many cases, therefore, we lose more in one direction than we gain in the other; for while the digitalis has supplied nothing to the nutrition of the heart fibre, the extra work which the heart has been compelled to do, on account of the

increased peripheral resistance, constitutes a direct expenditure of energy with a molecular waste which cannot be regained. We may, however, by combining with digitalis an arterial relaxant, obtain the action of digitalis upon the heart without at the same time the disadvantage of increased peripheral resistance. Therefore, it should be a cardinal rule in these cases that digitalis be not employed except in combination with nitro glycerine, sodium nitrite, aconite, or some other drug having the power of relaxing the arterioles. There is, however, one advantage which digitalis possesses in a marked degree, and that is that it lengthens the period of diastole, during which chiefly the heart muscle is nourished through the coronary vessels. A judicious use of digitalis, therefore, favors the nutrition of the heart, a point of the ~~importance~~ possible importance, for when the heart is beating as rapidly as one hundred and thirty or one hundred and fifty times per minute, the opportunity for receiving blood into its own structure is correspondingly limited. Caffeine acts in somewhat the same manner as digitalis, and probably with less effect upon the arterial tension. A valuable agent in these cases is strychnine, although it acts simply through the cardiac centres, and serves only to give a temporary stimulus to the heart's action, without contributing to its nutrition. Our employment of drugs with reference to the cardiac condition will therefore embrace, on the one hand, such as stimulate the action of the heart, and, on the other, such as diminish the tension in the circulation. A favorite combination of this kind is digitaline, strychnine and aconite. These drugs may be given, the first, in a dose of one-sixtieth of a grain, and the two latter, in the dose of one one-hundred-and-twentieth of a grain each, every hour until the frequency of the pulse is reduced to about one hundred by the digitalis, while the aconite, acting upon the heat-producing as well as the vaso-motor centre, brings down the temperature to about 101°.

The "sedative dose" of calomel (twenty-five to forty grains), so successfully employed by Dr. Leaming, has often rendered me good service in cases of this type. The promptness with which it acts upon the temperature suggests a neutralizing effect upon the toxic material in the blood. It should be given dry upon the tongue, and fluids should be withheld for two or three hours, to prevent an excessive cathartic effect.

When the temperature remains high the external use of cold is often very beneficial. A convenient method of applying cold is by means of a coil laid over the abdomen, or cold sponging may be employed as in typhoid fever.

The management of such a case is admirably illustrated by the

following history abbreviated from the records of the Presbyterian Hospital.

J. S., aged 34. Service of Dr. Thompson. Acute Lobar Pneumonia. Repeated chills, great general depression.

On Admission, much dyspnoea. Pulse 138, respiration 50, temperature 105. Considerable lung involvement; heart irregular; pulmonary second sound feeble. Ordered hypodermic injection of nitroglycerine $\frac{1}{100}$ every hour; whisky, $\frac{1}{2}$ oz., q. 4 h. On the following day the pulse and respiration were less frequent, temperature still 105. Cold sponging reduced the temperature $1\frac{1}{2}$ degrees within $1\frac{1}{2}$ hours. Ord. stry. sulph. gr. $\frac{1}{30}$, q. 3 h. beginning at the end of the second day after admission. On the third day the nitroglycerine was stopped and the strychnine and whiskey given q. 6 h., the pulse ranging from 92 to 100, and the resp. from 24 to 30. Temp. $99\frac{1}{2}$. Discharged cured, April 28th.

[The following case from my private practice is a type of the asthenic form of pneumonia.]

Mrs. W. S., aged 38, seen with Dr. Schminke, Feb. 20, 1895.

Patient was well on the 16th with the exception of a slight bronchitis, which did not confine her to the house. On the 17th she had a prolonged chill followed by great prostration forcing her to take to her bed immediately. T. 103° . On the 18th there was another chill, and the temp. rose to 104° . Signs of pneumonia in lower right lobe. On the 19th the temp. reached 105° , the pulse was very small and feeble and the prostration extreme. When I saw her on the 20th the temp. was $104\frac{1}{2}^{\circ}$; pulse 150-154, very small and weak; resp. 38-42. Pulmonary second sound clear and distinct, but not accentuated. The lung involvement seemed to be limited to the right lower lobe, but the condition of the patient precluded a thorough examination. Face flushed, lips red, no approach to cyanosis. Constant short cough with yellowish expectoration.

Dr. S. agreed with me that the case was one of extreme toxæmia, and that the right heart was in much better condition than the left. The only hopeful signs were the limitation of the pneumonic process and the clearness of the pulmonary second sound. There was extreme danger that the left heart would give out, especially in view of the long time that must elapse before defervescence could be expected.

The treatment agreed upon was strychnine, gr. $\frac{1}{30}$, q. 3 h. Morphia, gr. $\frac{1}{8}$ hypodermatically q. 4 h. Quin. sulph., gr. 10 daily. Whisky, $\frac{1}{2}$ oz., q. 2 h. Frictions to the right chest with mustard liniment. Milk, 1 to 2 pints in the 24 hours, with 20 minims of dilute muriatic acid to each pint.

Under this management, after 36 hours there was a gradual fall of pulse and temperature, and by the 27th convalescence was fairly established. The diet was almost entirely milk, and the quantity of this never exceeded 20 ounces in 24 hours. Dr. S. writes: "At no time was there any indication for the nitrites.

Presbyterian Hospital. Service of Dr. Smith.

R. H. Patient who had an alcoholic history, had a marked chill followed by general and sudden prostration. On admission, temp. 106, pulse 120, resp. 28. Much involvement of lung, some delirium. tremor and excitement. The respiration, notwithstanding the extent of the consolidation, never reached 40. The pulse continued very rapid, not in ratio with the respiration, even after the latter became normal. Temp. remained 105 and 106 for 4 days then gradually declined.

Oxygen was employed during the first three days, but did not materially lessen the frequency of the pulse or respiration. Nitroglycerine $\frac{1}{100}$ gr., q. h., had but little effect upon the pulse, but when it was increased to $\frac{1}{50}$ gr. q. h. and associated with strychnia gr. $\frac{1}{30}$, q. 2 h., the pulse gradually became slower, until the 6th day when it had fallen to 100, and the nitroglycerine was discontinued. Whisky was given freely from the beginning.

It was not until the 10th day after admission that the physical signs began to improve.

Ultimately a thrombus formed in the left popliteal artery gangrene of the leg set in, and amputation was performed. Patient recovered.

Our next patient is a man, sixty years of age, whose habits have been irregular, and whose constitution has been broken down by alcohol. He is now in the sixth day of the disease; the chill was not well pronounced; there was but moderate pain in the chest, but early in the case the difficulty of respiration became a prominent factor. We find him now with a temperature of 102°, a pulse of 130, and with 48 respirations to the minute. The face is pale, the lips blue, and the superficial veins are distended. On physical examination, we find that the lower lobe on the left side is for the most part consolidated; we find also that there are abundant mucous rales and slight dulness throughout the remainder of the left lung, and also throughout the right lung. We have, therefore, a condition of pneumonic consolidation in the lower lobe of the left lung, with œdema more or less pronounced in the remainder of that lung and throughout the other. This condition necessarily implies a very grave impairment of the respiratory function. The amount of air which finds its way to the pulmonary vesicles is reduced to an extent which seriously threatens death by asphyxia. On examining the

heart, we find by percussion that the right chambers are distended, the area of cardiac dullness being increased in the direction of the sternum. The pulmonary second sound is extremely feeble, being scarcely audible, obscured as it is by the mucous rales in that locality. The examination shows an increased area of hepatic and of splenic dullness, indicating that both the liver and spleen are distended with blood. The urine is albuminous. In short, we have everywhere the evidence of venous repletion. There is more blood in the viens and less in the arteries than in the normal condition. The obstruction to the pulmonary circulation calling upon the right ventricle for increased action, that portion of the heart is especially exposed to exhaustion. Thus, although we have the obstructive conditions which would lead to an increased accentuation of the pulmonary valve-sound, we have; on the other hand, such feebleness of the right ventricular systole that the blood is not thrown into the pulmonary artery with sufficient force to produce the recoil required for the normal valve sound.

The leading factor in this case, therefore, is the impairment of the respiratory function, and the consecutive exhaustion of the right side of the heart. The danger is that the right heart will fail. And yet the original area of pneumonic consolidation was not great, not nearly so great as in the first case which we examined; the difference lies in the condition of the circulatory apparatus, due, in the first instance, to the age of the patient and, in the second, to the alcoholic habit which has impaired the whole mechanism of circulation. With a vigorous heart and sound blood-vessels, the amount of pulmonary consolidation present would have constituted but a trifling danger. We have not in this case, either, the evidences of virulent infection, and the nervous system is not markedly implicated. The gravity of these cases cannot be appreciated by a study of the pulse, for it is not the left ventricle which is bearing the brunt of the battle, but the right, and it is not the failure of the heart as a whole which we have to fear, but a failure of the right heart, due to the extraordinary demand made upon its energy. What the finger upon the pulse indicates in regard to the condition of the left ventricle, the use of the stethoscope over the pulmonary artery will indicate with regard to the condition of the right ventricle. If the pulmonary valve-sound is distinct, it at least indicates sufficient power in the right ventricle to propel the blood into the pulmonary artery with force enough to so distend the artery as to produce by the recoil an energetic closure of the semi-lunar valves. A diminution of the accentuation of the pulmonary second sound, in the course of any disease involving obstruction to the pulmonary circulation,

implies one of two things, viz., either a diminution of the resistance which the blood meets with in passing through the lungs, or a diminution in the power of the right ventricle. Which of these two conditions is present can be determined by the general condition of the patient, and especially by the condition of the respiration. In the first case, there will be general improvement and diminished respiratory distress, and in the second case, there will be increasing failure of the general strength, and increasing embarrassment of respiration. The prognosis in the first condition is, of course, encouraging; in the second, it is altogether bad. Extinction of the pulmonary second sound with increasing respiratory distress, simply means that the right heart is becoming fagged out by the labor required to force the blood through the obstructed pulmonary circulation. Death under these circumstances takes place by failure of the right heart, and the post-mortem shows the right cavities and the pulmonary artery distended with blood. In a private note which received a few days ago from Dr. Daland, of Philadelphia, he describes the post-mortem appearances in four cases of this kind, which he had recently observed. The right auricle and ventricle and the pulmonary artery were crowded full with a substance resembling current jelly.

The tendency to an early unfavorable termination in these cases is less in the preceding type. Defervescence is not so marked nor so complete, and its occurrence does not affect the prognosis so favorably. The mechanical conditions are but little affected by the temperature, and death often occurs when the pyrexia is very slight.

The treatment in this class of cases must be directed primarily toward sustaining the power of the right heart, and diminishing as far as possible the resistance in the pulmonary circulation. Venesection would naturally suggest itself as a relief for the over-distended venous system, and, undoubtedly, in many instances it might be practiced with much benefit to the patient. Some years ago, Niemeyer asserted that, notwithstanding the prejudice against venesection, he would bleed in any case in which collateral fluxion was developed in the portion of the lungs unoccupied by consolidation. The idea that venesection must necessarily be restricted to sthenic cases, and to the early stage, has doubtless stood in the way of a very valuable therapeutic resource. The removal of a portion of the blood from the over-distended venous system would necessarily diminish *pro tanto* the labor of the right ventricle, and thus afford it an opportunity to recover in a measure from its exhaustion. But a similar result can be obtained without the spoliative action of the

lancet, for by increasing the area of the arterial system, it is possible to afford accommodation in it for a large proportion of the excess of blood accumulated in the veins. This is accomplished by the use of remedies which reduce the arterial tension, and it is precisely in this class of cases that the vaso-motor depressants are supremely useful. The effect of an appropriate dose of nitroglycerin upon the color of the lips and the distension of the veins in a case of threatened asphyxia from pneumonia has only to be witnessed to be thoroughly appreciated. By the use of these agents the pulse is changed from being small and creeping in character to the large, soft condition of low arterial tension. With this change the respirations will be found to be less frequent and less labored, the mucous rales in the chest will diminish, and the entire function of respiration and circulation will undergo marked improvement. Digitalis in these cases is absolutely contraindicated, unless its effect upon the vaso-motor system is thoroughly counteracted by the simultaneous use of arterial dilators. The uncontrolled effect of digitalis is to empty the arteries into the veins. Whereas our effect should be to empty the veins into the arteries. But digitalis is called for whenever the rhythm of the heart-beats is deranged, and especially if the pulse becomes intermittent. A very small amount will generally restore the rhythm, and the smallest quantity that will do this should be employed. In every case, however, it should be given in such combination as will prevent an increase of arterial tension.

Of the drugs that cause dilatation of the arteries, the most promptly acting is nitrite of amyl, given by inhalation, or nitroglycerin by the mouth or sublingually, while the most enduring effect is obtained from sodium nitrite. A good plan is to lay a foundation with the latter, giving two grains every two hours, and to supplement this with nitroglycerin, in doses of one one-hundredth one-fiftieth, or one twenty fifth of a grain as occasion arises.

In these cases, also, alcohol is of importance, for the reasons already given, and in the case of those having the alcoholic habit there is the additional necessity which is imposed by the fact that the withdrawal of alcohol under these circumstances would necessarily still further impair the vital forces, which habit has made dependent upon the supply of stimulants. Oxygen inhalations are often of extreme service. The effect of oxygen appears to be not only to satisfy the respiratory demand with a less bulk of air, but also to facilitate the circulation of the blood through the lungs. It is well known that blood highly charged with the products of respiration circulates with difficulty, and in proportion as we are able to overcome this condition by artificial additions of oxygen to the

air inhaled, we facilitate the pulmonary circulation, and thus lessen the labor of the right ventricle. The action of oxygen, therefore, is twofold. It is not unusual under its exhibition to find the respirations become markedly less frequent, and, at the same time, the mucous rales throughout the lungs lessen to a great degree. The first of these effects is due directly to the increased supply of oxygen to the air-cells; the second, to the improvement in the condition of the blood, by which it moves with greater ease through the pulmonary capillaries, thus diminishing the tension in those vessels, and with it the tendency to transudation.

It is also very important not to burden the system with more nutriment than is required. An excess of food in the alimentary canal gives rise to flatulence, which adds to the embarrassment of the respiration. Free play for the diaphragm, unimpeded by pressure from below, counts for much in the struggle for breath. An excess of nutritive material in the blood, beyond what can be assimilated under the existing condition of deficient oxygen supply, also makes the pulmonary circulation more difficult and increases the dyspnea.

Of course the characteristic features of the last two conditions may be, and often are, associated in a given case. We may have an intense toxic infection coinciding with great pulmonary and circulatory embarrassment, a combination that is extremely grave. To the weakness of the heart dependent upon vital causes is added the exhaustion of the right heart from its effort to overcome a mechanical obstacle. Only patients with exceptional vitality stagger through under this double burden. In treating this condition the resources of the physician will be taxed to the utmost. The inhalation of oxygen, artificial respiration, retaining the blood in the extremities by means of ligatures about the limbs—all these, in addition to the means already referred to, may be placed in requisition, and will occasionally prove successful.

I will quote here a portion of one of my clinical lectures at the Presbyterian Hospital, given Dec. 12, 1892:

"This patient, Charles Coleson, 35 years of age, was admitted Nov. 23rd with an acute lobar pneumonia. It first involved the entire lower lobe and half of the upper lobe on the right side, and, subsequently, the upper lobe of the left lung. The patient was for a while in a very critical condition, and inhalations of oxygen were given for twenty minutes in each hour for a long time, the frequency of the inhalations being reduced as improvement was noticed. His respirations reached 64 per minute at the time we were giving the oxygen, and its use evidently relieved him very materially. In the employment of oxygen here, we allow a very small stream of gas to es-

cape in front of the nose and mouth ; we do not put the tube into the mouth as is often done, for this does not generally succeed in getting the oxygen into the current of inspired air. Practically, there is no advantage whatever in the lavish use of oxygen, for the blood corpuscles will not take up more than a certain amount, and if you add enough oxygen to the air which reaches the air cells to make up for the deficiency of the air reaching these cells you accomplish all that can possibly be done in this way. If a sufficient amount of air reaches the air cells the blood will always take from the common air as much as is required, and an additional amount of oxygen does not produce any beneficial result. As ordinarily used, much of the oxygen is wasted without any corresponding benefit.

We treated this patient with strychnia and nitro-glycerine principally, along with alcoholic stimulation, giving him gr. $\frac{1}{30}$ of strychnia every two hours for a considerable time. He responded very nicely to it. His pulse has at times reached 136, his respirations 64, and his highest temperature was 105° —this was at the time of admission. In this patient we were encouraged even in the worst stage by the results of auscultation, for the pulmonary second sound was fairly strong, showing a pretty good condition of the right heart.

MIKE MCCOE, 43 years of age, admitted Dec. 12th, 1892.

This patient was admitted with delirium tremens, and since then has developed a pneumonia. The pulmonary sound here is not very good. The whole of the right lung behind is dull on percussion, and over the lower portion there is distinct bronchial voice, yet at present his respirations are only 34; his color is good, and there is no evidence of any very alarming diminution of the respiratory surface. That the air gets to the breathing surface in sufficient quantity to keep up good aeration of the blood is shown by the pink color of the skin under the nails and the entire absence of cyanosis. His nervous symptoms, if referable entirely to pneumonia, would be of very evil prognosis, but they are largely due to his alcoholic condition. Of course the prognosis in these cases is much worse than in non-alcoholic subjects*. He has given his age as 46, but from his appearance I should say he was over 50 years, and this is also against him. His pulse is soft and weak. He will be given gr. $\frac{1}{30}$ of strychnia hypodermically every two hours, and this dose will be increased if necessary as tolerance becomes established. If the respirations should increase very much in frequency, and there should be evidence of deficient aeration of the blood, we shall begin the use of nitro glycerine,

* The patient made a good recovery.

and shall push it according to indications. I should also use a little hyoscine or some bromidia to quiet his nervous irritability. This last can be given safely, as any depressing effect from the chloral will be counteracted by the strichnia."

The subject is still farther illustrated by the following cases abbreviated from the case books of the Presbyterian Hospital.

Service of Dr. Northrup, Oct. 3, 1894. R. L., aged 40.

Initial symptoms, severe chill, prostration and pain in chest. On admission, cyanotic and respirations labored. T. 104. P. 140. R. 50.

Exam. Cyanotic and anæmic. Tongue coated. Heart feeble and pulmonary second sound very indistinct. Pulse full and of high tension. Lungs. Consolidation of whole R. lower lobe posteriorly, L. lower lobe post. intensely congested. Commencing œdema over R. lung in front. Ordered, Whiskey $\frac{1}{2}$ oz. every 4 hours.

Nitroglycerine $\frac{1}{100}$ every hour.

Strych. $\frac{1}{30}$ every 4 hours.

Sponge baths at 95 degrees when hyperpyrexia of 102. More comfortable after baths and slept. T. reduced about 1 deg. each time. No delirium. Some cyanosis.

2nd day. Cyanosis disappeared.

Pulmonic second sound more distinct and pulse "softer and full." Breathing over R. lung slightly improved. T. $102\frac{1}{2}$ - $103\frac{1}{2}$. P. 108-120. R. 40-48.

3rd day. Pulse soft and compressible. Pulmonic second sound very distinct.

Reduce nitroglycerine to gr. $\frac{1}{100}$ every 2 hours and increase strych. to gr. $\frac{1}{30}$ every 3 hours. Whiskey every 2 hours and oxygen (15 min.) every hour.

Feet cold. Slight abdominal distension. Bore last bath badly. Shivered; cyanotic. Pulse rapid; headache. It (the bath) did not lower temp. this time. Baths stopped T. $102\frac{1}{2}$ - $104\frac{1}{2}$. R. 40-48. Pulse 92-122.

4th day. T. 103 - $104\frac{4}{5}$. R. 40-60. Pulse 120-140.

Increase Strych. to gr. $\frac{1}{20}$ every 3 hours.

Increase Nitroglycerine to $\frac{1}{100}$ every hour.

Ice to chest.

Consolidation extending over both lobes of left lung. Some cyanosis.

Oxygen relieves very much.

5th day. Pulse small, tense, rapid. Respiration easier. T. $101\frac{1}{2}$ – $104\frac{1}{2}$. Pulse 112–136. R. 36–52.

6th day. Oxygen increased to 30 minute inhalations every hour. Breathing more easily. T. $100\frac{1}{4}$ –103. P. 112–116. R. 34–42.

7th day. Percussion almost flat. Give nitroglycerine every $\frac{1}{2}$ hour. The pulse then fell from 122 to 104 within 6 hours; the respiration from 52 to 40.

The nitroglycerine again reduced to every hour. Following this the extremities are cold and there is some cyanosis. T. 100– $101\frac{1}{2}$. R. 32–52. Pulse 122–104.

8th day. Oxygen relieving dyspnea greatly.

From this on convalescence began. Cynosis rapidly disappeared and the pulmonic sound became distinct

This case would show the most marked good effects of nitroglycerine in reducing tension and relieving cyanosis and œdema. The oxygen inhalations reduced the respirations and gave great relief.

Whiskey was given freely. —

Rev. Mr. D. Aged 26. Service of Dr. Smith.

Before admission, severe chill lasting three hours. Severe pain in chest, rusty expectoration, some delirium.

Dec. 16, '93. On admission, T. 103.6, R. 24, P. 120. Lung involvement slight, faint systolic mitral murmur. Whiskey $\frac{1}{2}$ oz., q. 4 h.

17. Area of bronchial breathing increasing P. 112 to 128, R. 32 to 48, T. $104\frac{1}{2}$.

18. Area of bronchial breathing increasing, P. 100 to 136, R. 28 to 56. Nitroglyce. $\frac{1}{50}$ q. h.

19. Signs of œdema in both lungs, very cyanotic. P. 104 to 150. Resp. 40 to 58. Nitroglycerine $\frac{1}{50}$ every hour, or half hour oxygen for ten minutes every half hour. Hyoscine and morphia to quiet delirium.

20. Had a good night and is refreshed. Rt. lung is clearing up, left lung is becoming involved.

The oxygen has afforded great relief, but the effect of the nitroglycerine has been surprisingly beneficial. On several occasions when the face was blue and the lips livid, and patient unconscious, the hypodermic injection of $\frac{1}{50}$ gr. produced immediate relief, restoring a natural color to the face and lips.

bringing back the patient to consciousness, reducing the frequency of the respiration and increasing its depth, and effecting each time what seemed practically a resurrection.

21. Had a good night. P. 112 to 128. R. 40 to 42. T. 104.2.
22. P. 102 to 116. R. 36 to 40. Temp. to-day for the first time below 104.

Patient recovered after a tedious convalescence.

The nitro-glycerine was reduced to $\frac{1}{100}$ gr. q. 2 h. on the 26th, and soon after discontinued.

Examination of the records of the Presbyterian Hospital shows the interesting fact that from the time, in 1891, when the condition of the pulmonary second sound in pneumonia began to be noted in my service, in nearly every fatal case in which the sign was recorded the sound is stated to have been feeble or inaudible almost from the outset.

22 EAST 42D ST.,
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